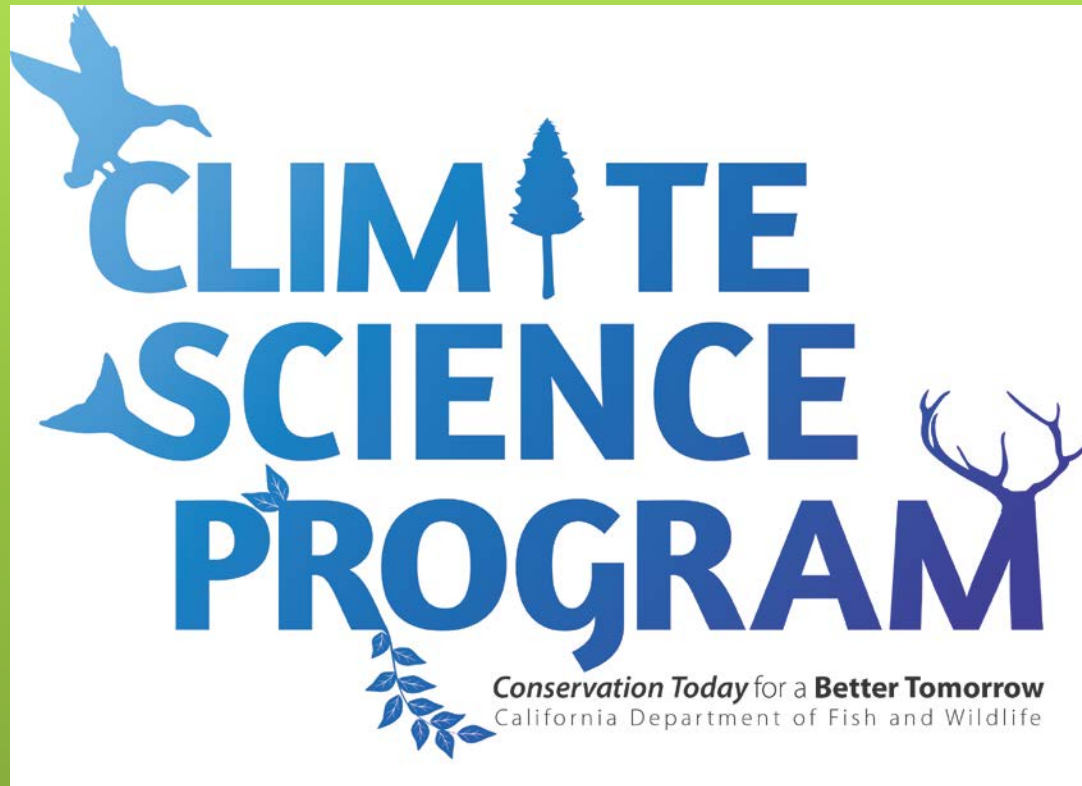


Unity-Integration-Action: California's Approach to Mainstream Climate Adaptation into a State Agency



Amber Pairis Ph.D.
California Department of Fish and Wildlife
National Adaptation Forum
April 2, 2013

Developing a Climate Science Program

- Increase the visibility of DFW's role as part of the climate solution.
- Voice for wildlife and habitats in climate adaptation discussions.
- Develop a climate change strategy within the Department's management and policy branches.
- Integrate a thought process into all of our natural resources activities that actively addresses climate change adaptation.

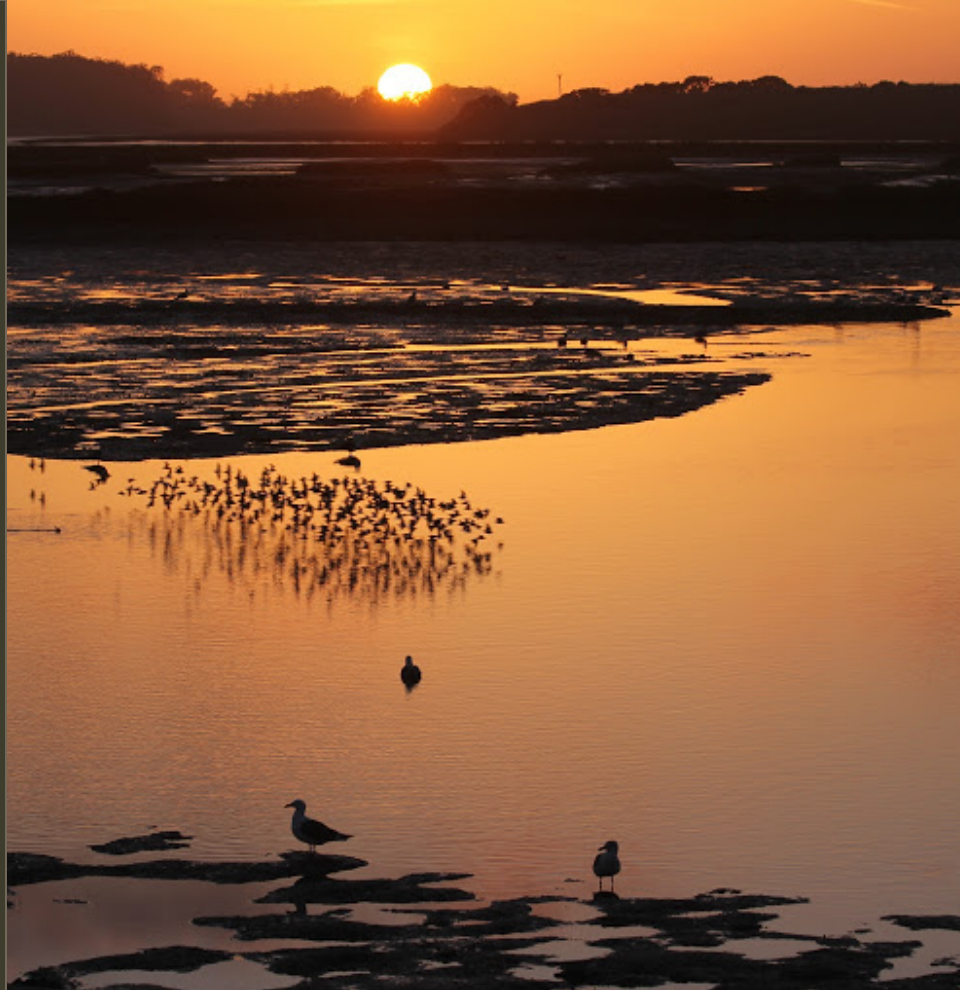
CA Department of Fish and Wildlife (CDFW)

- Mission: Manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend for their ecological values and for their use and enjoyment by the public.
- Public Trust Doctrine: Wildlife is owned by no one and held in trust by governments for the benefit of present and future generations.



CDFW Mandates

- Biodiversity Conservation
- Hunting, Fishing, and Public Use
- Management of Dept. Lands & Facilities
- Law Enforcement
- Communication, Education & Outreach
- Oil Spill Prevention & Response



CDFW Branches & Regions

- Administration
- Enforcement
- Resource Management & Policy (*Policy Branches*)
 - Wildlife
 - Water
 - Habitat Conservation
 - Fisheries
 - Data
 - Climate Science & Renewable Energy
- Regional Operations (*Implementation*)



CDFW Climate Science Program: *Unity-Integration-Action*

Unity

Creating and
maintaining vital
partnerships &
collaborative
efforts

Integration

Integrating climate
change into DFW
programs and
policies

Action

Products and
projects that are
meeting our
conservation
objectives

Working with Partners

National/regional/state-wide & local coordination and collaboration

- National Fish, Wildlife, and Plants Climate Adaptation Strategy
- National Climate Assessment
- Association of Fish and Wildlife Agencies
- Western Association of Fish and Wildlife Agencies
- Southwest Climate Science Center
- LCCs: California, Desert, North Pacific, Great Basin
- Bay Area Ecosystem Climate Consortium
- San Diego Climate Collaborative
- LA Regional Collaborative
- **CDFW Climate Stakeholders**



CDFW Climate Stakeholders Work Groups



★ **Policy/Planning** **Research/Training**
Education/Outreach

EXECUTIVE
2012
CLIMATE
STRATEGY
A Report
in Response



on, and Action:

onfronting Climate California



NATIONAL *fish, wildlife & plants*
CLIMATE ADAPTATION STRATEGY

2013 Update



California Department of Fish and Game
April 2011



Unity, Integration, and Action: Climate Change Adaptation Case Studies



California Department of Fish and Game
August 2011

Objective 5: Managing Endemic and Other Priority Species Populations

Efforts that actively facilitate the ability of species, habitats and ecosystems to accommodate climate change may be necessary to protect highly valued species or ecosystems when other options are insufficient. The DFG is working to identify and protect critical habitat for vulnerable and declining populations under current and future climate conditions through the use of data driven analysis and targeted restoration efforts. By evaluating and modifying management actions that address declining and vulnerable populations, adaptive management strategies can be built that will allow for appropriate adjustments to be made to help stabilize these populations in the future.

The Fisheries Restoration Grant Program

With the population of some salmon species at critically low levels, restoring anadromous salmon and steelhead habitat is a commitment the DFG and our partners have embraced. The DFG recognizes that climate change is expected to alter the behavior and distribution of ocean and coastal species as air and water temperatures rise and natural ecosystems are altered. The 2009 *California Climate Adaptation Strategy*³ includes as a guiding principal to “Give priority to adaptation strategies that initiate, foster, and enhance existing efforts that improve economic and social well-being, public safety and security, public health and environmental justice, species and habitat protection, and ecological function.” As a near-term action, the Strategy states that for Habitat Protection, “State agencies should identify key habitats that may require more protections as a result of climate change impacts and should plan additional buffer areas where necessary to allow for climate change phenomena...”⁴



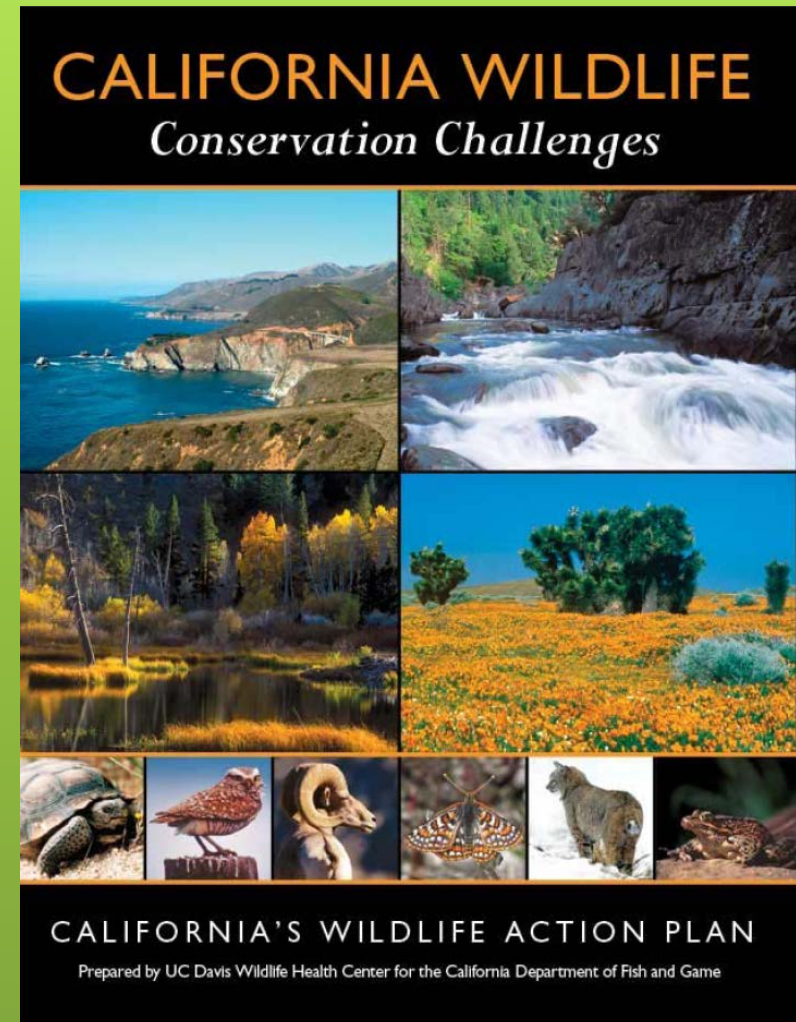
For nearly three decades, projects funded by the DFG's Fisheries Restoration Grant Program (FRGP) have enhanced salmonid species' adaptation potential by restoring and preserving habitat. The realization of climate change places a great urgency on DFG and its partners to accelerate and continue restoring and preserving habitat that will be

³ CA Natural Resources Agency, 2009. 2009 California Climate Adaptation Strategy. California Natural Resources Agency, Sacramento, CA. <http://www.climatechange.ca.gov/adaptation>

⁴ Fisheries Restoration Grant Program, 2010. Migration Proposal Solicitation Notice Coastal Salmon and Steelhead Migration Improvement

State Wildlife Action Plan Update

- Create a collective vision
- Incorporate cc impacts & adaptation strategies
- Update species at risk, vulnerable spp, & SGCN
- Conservation actions consistent with other agencies

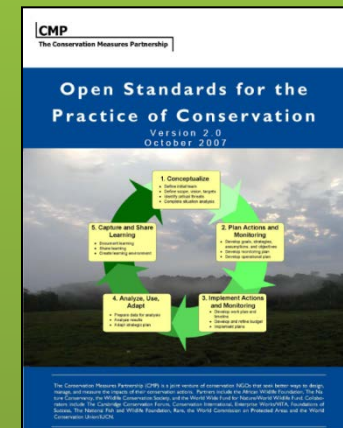
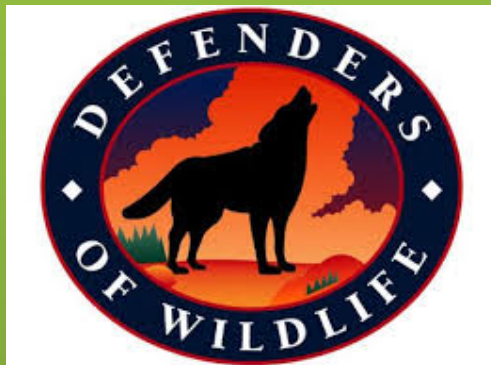
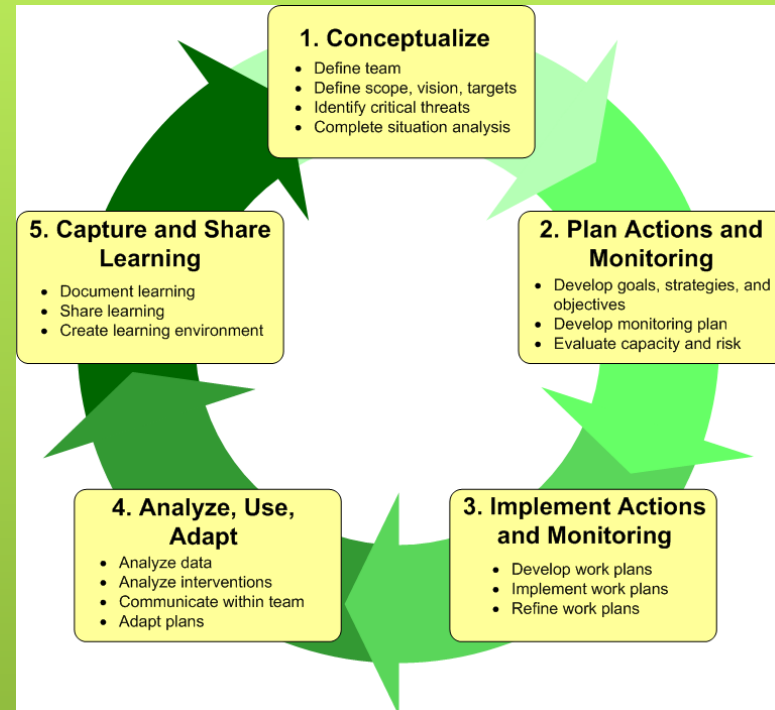


SWAP Climate Workgroup



- Stakeholder input
- Network of climate expertise to support revision
- Provide resources for ecoregional teams
- Participate directly with ecoregional teams

SWAP: Open Standards Process



CDFW Climate Stakeholders Work Groups



Policy/Planning ★ **Research/Training**
Education/Outreach

Collaborative Climate Research 2011-13

- Tidal marsh bird population and habitat assessment for SF Bay under future climate change conditions
- Vulnerability analysis and monitoring program for detecting changes in San Francisco Bay tidal marsh bird populations resulting from climate change
- Determining landscape connectivity and climate change refugia across the Sierra Nevada
- Developing an online invasive species risk-mapping tool: Climate change adaptation through strategic management of a top ecological stressor
- **Climate change vulnerability assessment: rare plants, southern Sierra, herps, mammals, and Birds in California**

Spotlight: Vulnerability Assessment

Bird Species of Special Concern - Climate Change Vulnerability - Mozilla Firefox

data.prbo.org/apps/bssc/index.php?page=climate-change-vulnerability

California Bird Species of Special Concern

Home Maps Resources About Partners

Climate Change Vulnerability Species Scores

To download this report select your preferred format next to "copy table to:" below

1 of 37

CommonName	ScientificName	Habitat Suitability	Confidence	Food Availability	Confidence	Extreme Weather	Confidence	Habitat Specialization	Confid
Abert's towhee	Pipilo aberti	1	0.5	1	0	3	1	1	1
Alameda song sparrow	Melospiza melodia pusillula	3	1	1	0	3	0.5	3	1
Alaska marbled godwit	Limosa fedoa beringia	2	0.5	2	0	1	0.5	2	1
Aleutian cackling goose	Branta h. leucopareia	2	0.5	1	0.5	1	1	2	1
Allen's hummingbird	Selasphorus sasin	2	1	1	0	1	1	1	1
American avocet	Recurvirostra americana	2	0.5	1	0.5	1	0.5	2	1

Climate Change Vulnerability Assessment for Rare Plants



Brian Anacker, Krystal Leidholm,
Steve Schoenig, Melanie Gogol-Prokurat,

In Progress

- Inland fishes
- Mammals
- Reptiles/amphibians
- Southern Sierra



Biogeographic Data Branch
California Department of Fish and Game

Research Funding Provided
By The California LCC



Collaborative Climate Workshops

- SWAP Revision: Open Standards & Climate Integration (2012-13)
- WAFWA Directors' Forum on Climate (2011)
- Climate Downscaling: Researcher-Manager Forum (2010)
- WAFWA Plenary: Energy, Water, and Wildlife: Balancing our Future (2009)
- Climate impact to Fish and Wildlife in CA (2008)
- SWAP through a climate lens (2008)

**CLIMATE SCIENCE PROGRAM**

- » [Activities](#)
- » [Resources](#)
- » [Partners](#)
- » [DFG Going Green](#)
- » [Climate Change Case Studies](#)
- » [Vulnerability Assessment Tools](#)
- » [Western Association of Fish and Wildlife Agencies](#)
- » [Director's Bulletins](#)
- » [Legislation and Policy](#)

Climate Science and Renewable Energy Branch
1416 9th Street
Sacramento, CA 95814
climatechange@dfg.ca.gov

[Home](#) » [Climate and Energy](#) » [Climate Change](#)

Unity-Integration-Action: DFG's Approach to Confronting Climate Change

In keeping with its mission, DFG is committed to minimizing to the maximum extent practical, negative effects of climate change on the state's fish, wildlife, and habitats through the development of adaptation and mitigation measures, policies, and practices that provide clear benefits to terrestrial and marine ecosystems and recognize the uncertainty associated with future climatic states. Through an approach that embodies the theme Unity-Integration-Action, DFG is laying the ground work for a proactive, adaptive, and collaborative approach to safeguarding California's fish, wildlife, and habitats for years to come. DFG staff and leadership recognize that emerging climate change science brings uncertainty and are committed to addressing this uncertainty through the use of a variety of planning tools and strategic initiatives. We also recognize the importance of developing and maintaining partnerships to more effectively address the broad scope of climate change issues. By working together and taking actions today we can better anticipate the effects of future climate change and fulfill our responsibility to conserve fish, wildlife and the places they live for future generations to enjoy.



» [Save the Date!](#)
January 31, 2012

» [Save the Date!](#)
February 21, 2012

» [DFG Climate State](#)

» [Unity Integration](#)

» [DFG's Role: Climate Change](#)
This special climate

Climate Change Vulnerability Assessment Resource Center - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Climate Change Vulnerability Assessment Re... +

www.dfg.ca.gov/Climate_and_Energy/Vulnerability_Assessments/

gmail

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[Home](#) » [Climate and Energy](#) » [Vulnerability Assessments](#)

Climate Change Vulnerability Assessment Resource Center

The materials presented on these web pages are meant to serve as a resource for those interested in learning more about climate change vulnerability assessment efforts, specifically those related to fish, wildlife, and habitats.

What is a Vulnerability Assessment?

Vulnerability assessments are a key element to successful climate change adaptation as they reveal what systems, species, populations, entities, etc. are most vulnerable to expected climatic changes, often depending on factors such as exposure, sensitivity, and adaptive capacity. With the increased recognition of the utility of vulnerability assessments, efforts to conduct these assessments are becoming more and more common, as these reports become available, we will continue to update this website. If you are aware of natural resource vulnerability assessments specific to fish, wildlife, and habitats or those specific to California that are not currently on our list, please let us know by sending an email to climatechange@dfg.ca.gov.

Climate Change Vulnerability Assessment Tools for Fish, Wildlife, and Habitats

- » [Tools / Resources for conducting a vulnerability assessment](#)
- » [Vulnerability assessments in California](#)
- » [Vulnerability assessments in other U.S. states](#)
- » [National/Regional vulnerability assessments](#)
- » [International vulnerability assessments](#)



CDFW Climate Stakeholders Work Groups



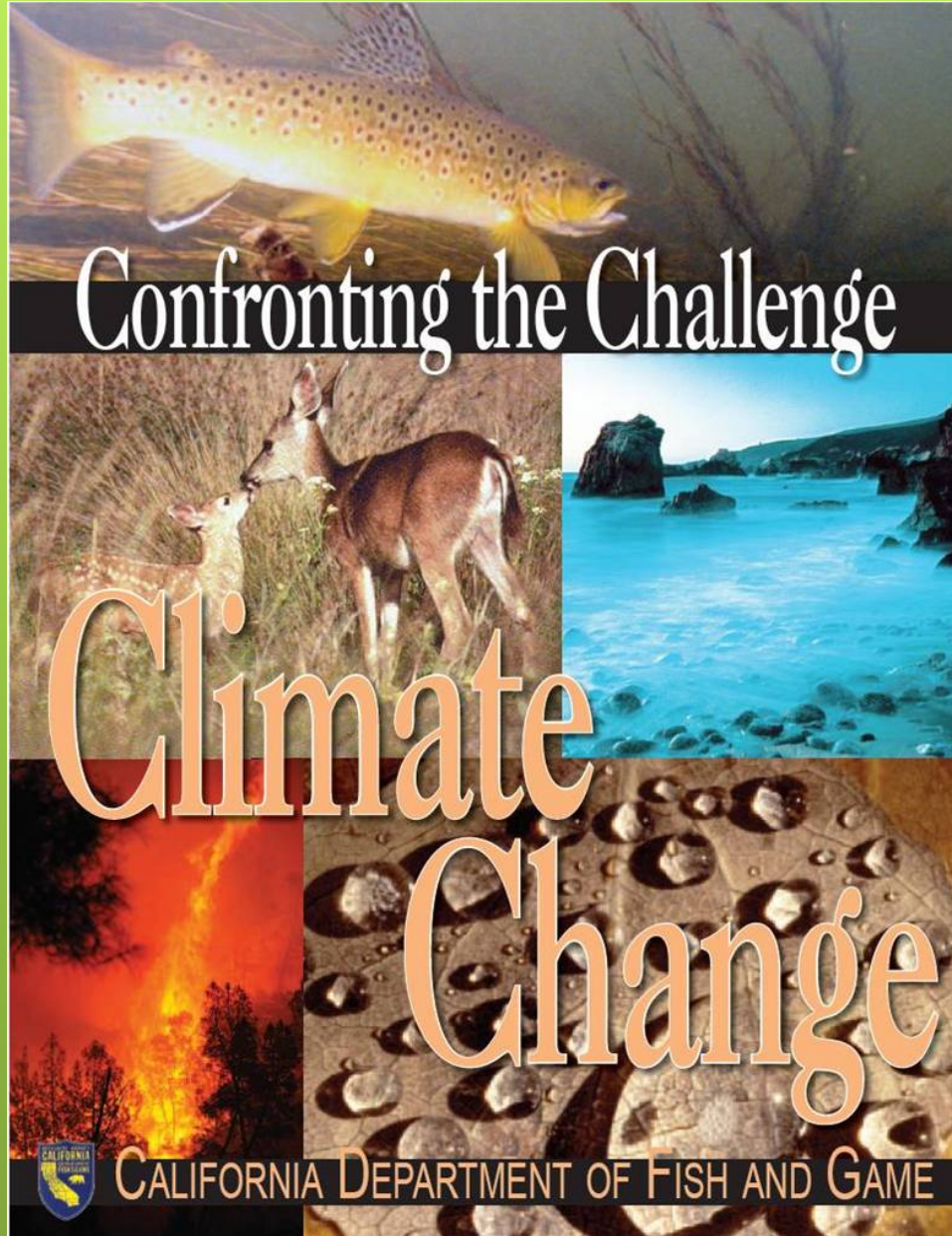
Policy/Planning

Research/Training



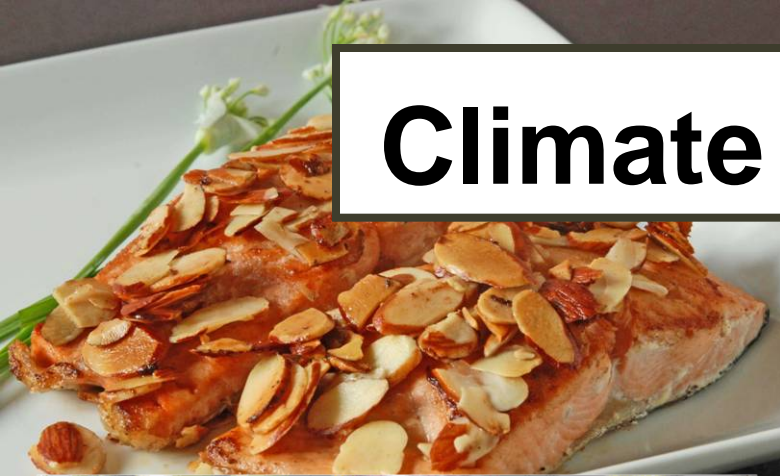
Education/Outreach

Education and Outreach



Gold Award
Excellence in Government
Communications
2010

Climate Change Menu



D R A F T

CLIMATE CHANGE on your plate



Today's Menu

Walnut encrusted trout served over Sacramento-grown rice with a mixed leaf salad and broccoli florets. Served with a delicious California wine.

MANY FOODS THAT WE ENJOY TODAY MAY BECOME MORE LIMITED IN THE FUTURE OR MAY NO LONGER BE LOCALLY HARVESTED DUE TO PROJECTED CLIMATIC CHANGES IN CALIFORNIA.

- Changes in temperature and precipitation can cause stream temperatures to rise, degrading habitat for cold water fish such as trout.
- Climate change will impact the growing season for California's agricultural products, including altering "winter chill" periods required by fruit and nut trees.
- Higher temperatures, especially at night, can substantially decrease grape quality and productivity for wine production in the state.
- Changes in snow accumulation and snowmelt can negatively impact water availability for agriculture, drinking water, and water for wildlife.
- Sea-level rise and changing ocean chemistry can degrade ocean and estuary habitats that protect our fisheries.

RECIPE FOR ACTION

The state is committed to reducing the causes of climate change and responding to the impacts now and in the future. Here's how you can help:

- Walk, bike or car-pool to lower your contributions to climate change.
- When available, buy local to reduce the distance your food must travel.
- Conserve water - reducing water use also reduces energy use and greenhouse gas emissions.
- Collaborate with state agencies to conserve California's natural resources and safeguard wildlife and water for the benefit and health of all Californians.



California State Agencies are working collaboratively to safeguard the food on your plate.

www.dfg.ca.gov/climatechange

Climate Curriculum Materials

http://www.dfg.ca.gov/Climate_and_Energy/Climate_Change/For_Teachers/ For Teachers - Climate Sci...

CA.GOV CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

Home Recreation Resource Management Enforcement Marine Spills Education Science Institute Data & Maps

Fish, Wildlife and Habitat Management

Climate Science Program Home → Climate and Energy → Climate Change → For Teachers

Activities
Resources
CDFW Climate College
CDFW Climate Stakeholders
CDFW Going Green
Climate Change Case Studies
Vulnerability Assessment Tools
For Teachers
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climatechange@wildlife.ca.gov


For Teachers Only: Curriculum Resources for Biodiversity and Climate Change

CDFW is committed to supporting and empowering our staff, partners, the public, and the next generation to be stewards of our natural resources in the face of a changing climate. Outreach and education are a key component to supporting climate change adaptation efforts that safeguard not only natural resources but people and places. CDFW's Climate Science Program staff have focused significant time working collaboratively with partners to create resources that help educate and increase awareness about climate change and positive ways to support conservation of wildlife and habitats in a changing climate. This web page was specifically created to support educators' efforts to bring climate change curriculum into the classroom so that they can inform and empower the next generation of leaders who will be responding to climate change impacts. While there are a growing number of resources for educators on climate change there are only a select number of resources that are specific to wildlife and habitats. We hope to update this list periodically as new resources become available. If you are interested in contributing information or ideas to this effort please contact climatechange@wildlife.ca.gov

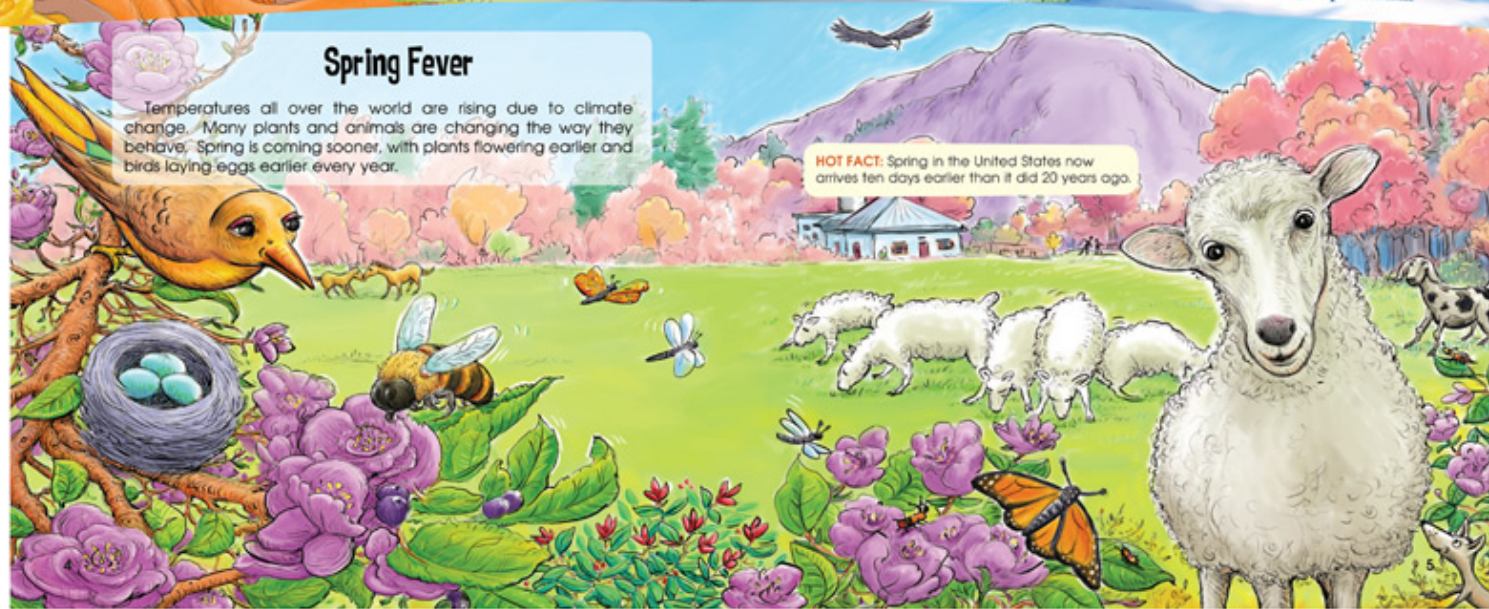
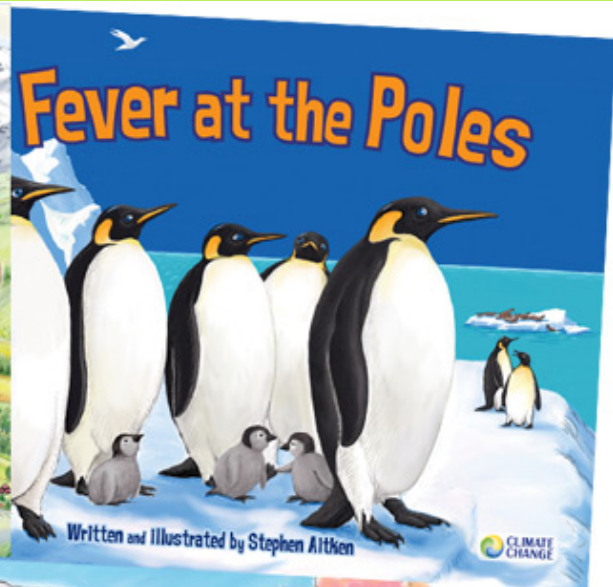
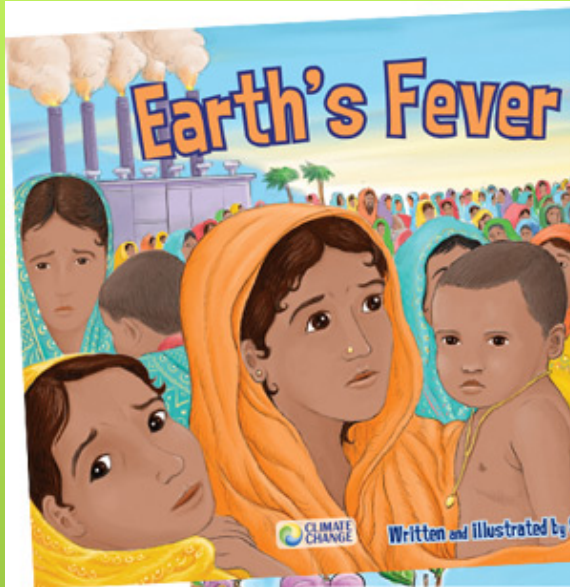
* Note: The following sites and materials are not endorsed by the CDFW.

Climate Change Curriculum and Lesson Plans related to Wildlife and Habitats

- [Climate Change Wildlife and Wildlands: a Toolkit for Formal and Informal Educators \(US Global Change Research Program\)](#)
 - [Climate change wildlands and wildlife video](#)
- [A student's guide to global climate change \(EPA\)](#)
 - [How climate change will impacts plants, animals, and ecosystems](#)
- [Climate change education resources \(NOAA\)](#)
 - [Teacher background information: climate change and ecosystem response \(PDF\)](#)



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Building a CDFW Community of Climate Practitioners



DFG SPOTLIGHT ON CLIMATE CHANGE

FEATURING: GORDON LEPPIG



Q. What kind of work do you do for DFG and how long have you been with the Department?

A. My 10 year tenure with DFG has focused on project review and permitting. I have reviewed timber harvesting plans, city and county general plans, and major developments such as bridge, highway and wind energy projects. My purpose is to determine what, if any, significant environmental impacts a project may have and recommend feasible ways to avoid or minimize those impacts. For the past year, I have been the lead on the Klamath River dam removal project Environmental Impact Report.

Q. What is your favorite part of California and why? Do you have a favorite CA species? Favorite habitat type? And why?

A. I am smitten by California's coastal ecosystems. I love the beaches and dunes, the lagoons, bays, salt marshes and estuaries. They are teeming and energized with life: whales, seals, otters, fish, birds, interesting plants and fungi. For me, California's coastal habitats embody beauty, complexity, diversity, and tranquility. Sitka spruce, on land, and eel-grass, in the estuaries, both hold special charm and are habitat for numerous other critters.

Q. What is your biggest concern regarding climate change?

A. I am very concerned that sea level rise and changed ocean conditions could result in habitat loss resulting in the decline of numerous species. Plus, millions of Californians live near the Pacific Ocean because they value its beauty and many other amenities. Thus, the potential loss of coastal dunes, sea bluffs, salt marshes and estuaries to sea level rise could also threaten our coastal human communities. This could affect our quality of life, including where we live, what we eat, how we recreate, our health and safety during storm and flood events, and for many, such as commercial fishers and crabbers, their careers and economic well-being.

Q. In ten years how do you think the responsibilities of your position will change due to climate change?

A. I think DFG will need to engage in more robust regional planning efforts. We will work more closely with more partners to develop scenario-based planning and adaptive co-management approaches to protect whole ecosystems and ranges of species. Our emphasis will shift more to a regional and proactive conservation stance from a current approach that is often more population-focused and project-responsive.

Q. What do you see as some of the short term opportunities for DFG to address climate change?

A. DFG is just beginning to make reducing our carbon footprint a major departmental objective. I applaud this and hope we continue implementing sustainability programs with alacrity. A fleet of high-efficiency cars would help and the paperless office initiative could be a game-changer in optimizing how we conduct business. I think we will continue to seize opportunities to raise climate change and sea level rise-related impacts during our project review and regional planning work. To enhance our effectiveness, I believe DFG staff would benefit from more training and assistance with climate change impact assessment and in promoting adaptation strategies.





California Department of Fish and Wildlife

Sustainability Policy
& Guidelines

Paperless Office

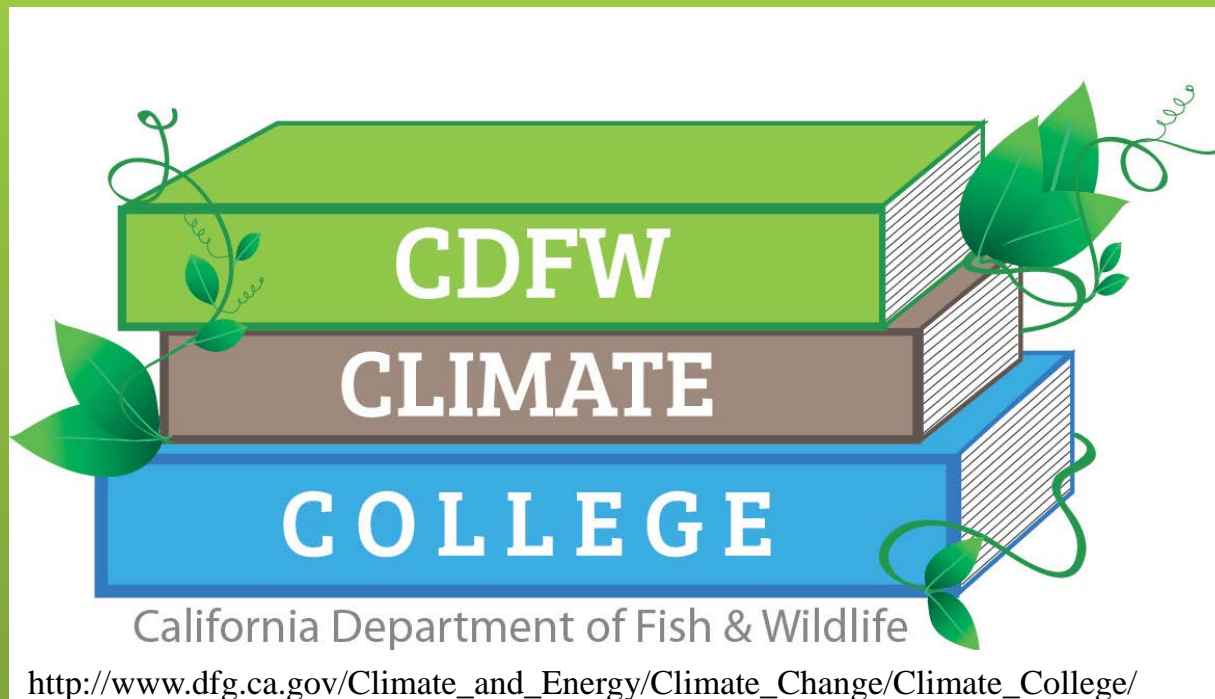
DFW Bikes!

Sustainability
Super Stars

http://www.dfg.ca.gov/Climate_and_Energy/Going_Green/

CDFW Climate College

- Build a climate community at CDFW that includes our partners
- Provides a foundation of climate change knowledge for ALL staff
- Promotes networking across branches/regions AND with our partners
- New approach to training that will evolve over time



Measuring Success

- How do you measure the success of integration or mainstreaming?
- How do we measure the change in the culture of an agency?
- How do we communicate a view of success that is not product oriented?



Seeing Success Everyday

- Climate College participation & projects
- Documents and plans that include climate change
- Staff time devoted to climate change
- Regional working groups
- Climate change adaptation on the ground

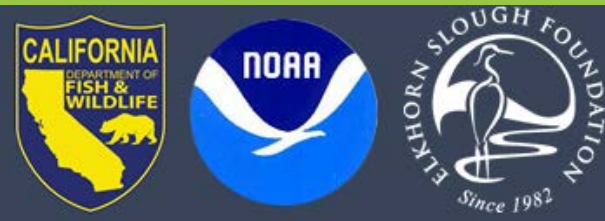
Adaptation Action: Elkhorn Slough

Climate Research & Monitoring

- Water Quality
- Habitat Change
- Biological Indicators

Adaptation Projects

- Oyster restoration
- Wetland-upland ecotone as indicator
- Tidal restoration



Thank you!

DFW Climate Change website

www.dfg.ca.gov/Climate_and_Energy/Climate_Change/

Email: climatechange@wildlife.ca.gov



All photos courtesy of Tim Hovey, Dave Feliz, and Meredith Osborne, CDFW